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## PEOPLE'S REPUBLIC OF CHINA SCIENTIFIC ABSTRACTS

No. 179

This serial publication contains abstracts of articles published in selected scientific and technical journals. JPRS is unable to honor requests for original source materials or information as to the availability of full translations of these articles.

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AERONAUTICAL KNOWLEDGE

AUTHORS: FU Ch'ang-ch'ing [4569 7022 7230]  
LAN Ta-ying [3663 1129 5391]

ORG: None

TITLE: "Armed Helicopters"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE] in Chinese, No 6, June 77, pp 5-6

ABSTRACT: Armed helicopters are commonly used in the following tactical applications: 1) provide close air support to the ground troops during a battle; 2) destroy enemy tanks by using anti-tank missiles, airborne cannons, rockets, and laser-guided bombs; 3) escort cargo helicopters for transporting troops and supplies; and 4) engage in air combat with enemy helicopters.

AUTHOR: LU Wen [7773 2429]

ORG: None

TITLE: "The Flight of Pilotless Airplanes"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE] in Chinese, No 6, June 77 pp 7-9

ABSTRACT: The flight of a pilotless airplane can generally be divided into three stages: the initial flight stage, the mission execution stage, and the flight termination stage. The initial flight stage can take the form of either "ground take-off" or "release from a mother airplane". In the former case, the pilotless airplane may: 1) take off from a conventional run-way; 2) take off from a gliding vehicle; 3) take off from a launch structure by rockets; or 4) take off vertically. In the latter case, the pilotless airplane is carried by either a cargo plane, a bomber, or a fighter plane and released from the mother plane via command control or automatic control when the speed and altitude reach certain pre-assigned values.

AUTHOR: WANG Shou-yun [3769 1108 0061]

ORG: None

TITLE: "Panoramic View With Remote Sensing Devices"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE] in Chinese No 6, June 77 pp 10-13

ABSTRACT: Like the human eye, a remote sensing device has two basic components: 1) an energy collecting element, which may be an optical lens, infrared reflector, or microwave antenna; 2) a detecting element, which may be photo-sensitive film, photo-electric semiconductor, or microwave resonator. In general, the resolution capability of a remote sensing device is proportional to the product of the emitter frequency and the aperture size. There are two types of remote sensing devices: active device(e.g., a radar) which has a radiation source for illuminating the targets; and passive device(e.g., optical and television cameras, spectral analyzer, etc.) which relies on solar reflection or thermal radiation as the illumination source. The photographs obtained from a remote sensing device contain a vast amount of data which can be digitized and then processed by a computer to recover the information. The major applications of space-borne remote sensors include: 1) global meteorological observations; 2) survey of natural resources; 3) astronomical observations; and 4) military reconnaissance.

AUTHOR: CHANG Ching-t'ing [1728 0513 2185]

ORG: None

TITLE: "Helicopter Technology in Ancient China"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE] in Chinese No 6, June 77 p 13

ABSTRACT: One of the earliest predecessors of the modern helicopter was probably the ancient Chinese toy "bamboo dragon-fly". It is estimated that this toy was invented over 2000 years ago and was introduced into Europe around the middle of the 15th century. Historical records also indicate that in the late 17th century, a skilled workman Hsu cheng-ming [1776 2973 2494] spent 10 years constructing a "flying vehicle" which had gear transmission and was able to move through the air several feet off the ground. Unfortunately, the technical details of this machine could not be found in the literature to verify that this was indeed the first helicopter in history.

AUTHOR: TSO Yang [1563 3142]

ORG: None

TITLE: "Rocket Powder"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE] in Chinese No 6, June 77 pp 14-16

ABSTRACT: Rocket powder is one of the two major types of chemical propellants used in a rocket engine. In this article, the basic differences between gun powder, conventional fuel, and dynamite are explained. The historical development and physical properties of the black powder are described. In addition, the chemical composition and physical properties of the dual-base powder and compound powder are presented. The specific merits of the compound powder are summarized and the specific impulses of seven different types of gun powder are compared.

AUTHOR: LU Hsi-tz'u [0712 6932 1964]

ORG: None

TITLE: "Prevention of Collision With Birds"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE] in Chinese No 6, June 77 pp 17-19

ABSTRACT: The possibility of collision of an airplane with a flying bird poses a severe threat to flight safety. According to statistics collected by the U.S. Air Force, the number of destructive collisions with birds has averaged approximately 350 incidents per year since 1964. The impact force of bird collision depends on the weight of the bird and the velocity of the airplane. The parts of the airplane that are most vulnerable to damages are the windshield and the engine inlet. To prevent bird collision, measures should be taken to remove bird shelters near airports, and to install ground radar and special sensing devices on the airplane to detect bird movement along the flight path. To minimize the damages due to bird collision, the windshield should be made of highly elastic safety glass to absorb part of the impact; the windshield design should also be tested against high speed pellets shot from a compressed air gun.

AUTHOR: None

ORG: None

TITLE: "Hydrogen Induced Brittleness in Metal"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE] in Chinese No 6, June 77 p 19

ABSTRACT: When certain metals are subject to corrosion, hydrogen atoms are produced and dissolved in the metal. If the hydrogen concentration reaches a critical level, the metal will break abruptly under external stress. In the aeronautical industry, two kinds of metals are particularly sensitive to hydrogen induced brittleness: high strength structural steel and titanium alloy. Generally, the damages in metal can be caused by a small amount of hydrogen, but they occur only under loaded conditions, and the hydrogen content can be reduced by means of a baking process. With the increased use of high tensile strength steel on modern jet airplanes, the phenomenon of hydrogen induced brittleness has become a serious problem which must be resolved.

AUTHOR: YEN Li-t'ang [2518 4350 1016]

ORG: None

TITLE: "Relationship Between Forces and Structural Form"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE] in Chinese No 6, June 77 pp 20-22

ABSTRACT: A turbo-jet engine is subject to three kinds of static forces: gas pressure force, inertia force and thermal load, and to the dynamic force due to vibration. This article discusses the problem of structural design of a jet engine by analyzing the static forces and by applying the concept of "equal-strength design". In particular, the method of equalizing forces generated by the rotors of the compressor and the turbine to reduce the load on the thrust bearings is described. The use of an axle coupling to provide three-point support in order to carry the radial load and at the same time achieve uniform load distribution is also explained.

AUTHOR: WU Lin-yao [2976 3249 5069]

ORG: None

TITLE: "Radio Telemetry for Artificial Satellites"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE] in Chinese No 6, June 77 pp 22-25

ABSTRACT: In order to transmit the information on a large number of measured parameters from the satellite, radio telemetry has multiple channels which operate either on a frequency division basis or on a time division basis. In a frequency division system, the signals are modulated onto secondary carriers which are in turn modulated onto the main carrier. The secondary modulation may be amplitude modulation, frequency modulation, or phase modulation. In a time division system, each signal is divided into segments which are transmitted in a sequence of pre-assigned time slots. In order to minimize transmission errors due to interference, the analog signals are generally converted into digital form and modulated with pulse codes. This modulation process involves three steps: sampling, quantization, and encoding.

AUTHOR: WANG Po-yuan [3769 0130 6678]

ORG: None

TITLE: "The Rise and Fall of the Airship and Its Future Development"

SOURCE: Peking HANG-K'UNG CHIH-SHIH [AERONAUTICAL KNOWLEDGE] in Chinese No 6, Jun 77 pp 29-30

ABSTRACT: The airship was the earliest controllable flying vehicle man developed. Since the invention of the airplane, the use of airships became restricted due to its lower speed, higher cost, and lack of safety. During the Second World War and the 1950's, only the United States maintained a fleet of military airships. However, since the 1970's, the world-wide fuel shortage and environmental considerations have stimulated renewed interests in the airship. Many countries have initiated new programs to develop airships for transportation, exploration, construction, and communication purposes. New technologies are being applied in the design of airships to improve their reliability. Specifically, future development efforts are concentrated in the following areas: 1) basic research of airship performance; 2) experience in the operation and utilization of airships; 3) improving flight safety; and 4) developing special purpose engines for airships.

AUTHOR: None

ORG: None

TITLE: "Captions of Graphic Inserts"

SOURCE: Peking HANG-K'UNG CHIH-SIH [AERONAUTICAL KNOWLEDGE] in Chinese No 6, June 77 Inserts 1,2,3,4

ABSTRACT: Insert 1 shows graphical illustrations of the various tactical applications of armed helicopters as discussed in the article on page 5. Inserts 2 and 3 present two earth-view photographs taken from artificial earth satellites: one is an infrared picture of a land mass taken from a satellite 236 km above the earth; the other two are a regular color picture and color-treated picture of an oceanic region near the Bahama islands taken from a satellite 190 km above the earth. Insert 4 shows a photograph of the MIG-25 airplane which defected to Japan on 6 September 1976. Also shown is a photograph of the Soviet destroyer "Alert" on which a mutiny took place in November 1975.

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PROGRESS IN BIOCHEMISTRY AND BIOPHYSICS

AUTHOR: None

ORG: Shanghai Institute of Biochemistry, Chinese Academy of Sciences; Agarose Group, East Wind Biochemical Reagents Plant; Chung-shan Hospital Laboratory, First Hospital, Shanghai

TITLE: "Agarose Preparation, Determination, and Applications"

SOURCE: Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN  
[Progress in Biochemistry and Biophysics] in Chinese No 2, Apr 77  
pp 14-19

ABSTRACT: Agarose is a chain polysaccharide found in agar colloids of many types of seaweed. Agar as raw material in food products from north and south China is introduced, and preparation of agarose with relatively low (0.0-0.1 percent) cytochrome C adsorption as well as certain improvements in preparation and determination methods are briefly described. Initial observations regarding effects of agaroses with different adsorbed quantities of cytochrome C on quantitative determination of AFP ("rocket" electrophoresis and convective-flow immunological electrophoretic determination of

[continuation of SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN  
No 2, Apr 77 pp 14-19]

serum AFP sensitivity) and hepatitis B surface antigens are presented.

Paper received 14 Nov 75.

AUTHORS: LI Wen-chien [2621 2429 4675]  
WANG Hsiang-yun [3769 7449 0061]

ORG: Both of Office of Microbiology Teaching and Research, First College of Military Medicine

TITLE: "Introducing Two Types of Simple Homemade Cell Electrophoresis Devices"

SOURCE: Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN CHAN  
[Progress in Biochemistry and Biophysics] in Chinese No 2, Apr 77  
pp 20-23

ABSTRACT: Two types of simple electrophoresis devices developed by the authors are introduced: (1) a sealed round-capillary-type device with an organic glass electrophoretic plate measuring 13 x 3.5 cm, electrodes of copper or platinum filament mounted on organic glass strips, and a round capillary tube 6 cm long, 0.2 cm in diameter with internal diameter of 0.18 cm; and (2) an open rectangular flat-type cell electrophoresis device with a 7.3 x 4.2 x 0.4 cm organic glass electrophoretic plate, platinum electrodes, and a cell-suspension injector consisting of a tuberculin injector with a No 5 needle bent at a 90 degrees angle. Also described

[continuation of SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN  
No 2, Apr 77 pp 20-23]

are experimental comparisons of the two devices performed by the authors using a small number of blood specimens. The devices are advantageous in that multiple tests can be performed with relatively minute quantities of blood.

Paper received 10 May 76.

AUTHOR: None

ORG: Agricultural Techniques Popularization Station, Ch'nan-sha County Bureau of Agriculture, Shanghai Municipality

TITLE: "'702' Spraying Promotes Increased Cotton Yields"

SOURCE: Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN [Progress in Biochemistry and Biophysics] in Chinese No 2, Apr 77 p 24

ABSTRACT: Increases in cotton production (per mu increases averaging 14.95 catties, overall average increase of 12.3 percent) brought about through spraying of '702', a nucleic acid catabolic product, in eight experimental plots from 1972-1975 are described. For pest control, '702' was mixed with '223' and sprayed in 40-80-unit quantities 3-4 times during sprouting, budding, and boll-forming periods; control plots were sprayed with insecticides only.

Paper received 5 Nov 76.

AUTHOR: None

ORG: Shanghai Medical Instrumentation Institute

TITLE: "Brief Introduction to Chemical Refrigerators"

SOURCE: Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN [Progress in Biochemistry and Biophysics] in Chinese No 2, Apr 77 p 25

ABSTRACT: Brief discussion of principles and manufacture of simple chemical refrigerators, whose advantages include no need for power source, simplicity of construction, and inexpensive construction cost; drawback is that low temperatures can be maintained only 2-4 days. Manufacture is simple: a wide-mouth thermos clad with such materials as polystyrene or polyurethane foam or even cotton or wood shavings can be used.

Paper received Oct 75.

AUTHOR: None

ORG: None

TITLE: "Genetic Engineering Research Conference Convenes in Peking"

SOURCE: Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN  
[Progress in Biochemistry and Biophysics] in Chinese No 2, Apr 77  
p 25

ABSTRACT: Brief announcement of conference on genetic engineering research held in Peking from 28 February to 8 March. Delegates from various research units, factories, and higher-level hospitals and schools exchanged work experiences as well as information on genetic engineering abroad. Prospects for future development of China's genetic engineering research were fully discussed at the conference.

AUTHOR: CH'EN I-shih [7115 6654 6108]

ORG: Institute of Biophysics, Chinese Academy of Sciences

TITLE: "Fluorescence Analysis and Its Applications"

SOURCE: Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN  
[Progress in Biochemistry and Biophysics] in Chinese No 2, Apr 77  
pp 26-30

ABSTRACT: Paper provides brief introduction to fluorescence analysis and its applications by presenting an overview of such topics as effects of molecular structure and environment on fluorescence, features and methods of fluorescence analysis, and its applications in agriculture, environmental protection, clinical testing, analysis of agricultural chemicals and food additives, basic medical research, molecular biology research, as well as finding underground water sources with fluorescent dyes and applications in forensic medicine.

AUTHOR: WU Min [0702 1]

ORG: Institute of Oncology, Chinese Academy of Medical Sciences

TITLE: "Biological Foundations of Cancer (II)"

SOURCE: Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN  
[Progress in Biochemistry and Biophysics] in Chinese No 2, Apr 77  
pp 31-37, 19

ABSTRACT: In discussing the growth and evolution of cancers, the author addresses the general questions of the causative factors of imbalances in growth rates of malignant tumors and malignancy variability. Section 1 on cell cluster dynamics presents a survey of basic concepts, terminology, and developments in this field up to and including blocking of TAF synthesis or inhibiting its function to prevent blood vessels from growing into tumors; section 2 on the evolution of cancers describes various stages of cancerous change (differences in the order of certain pathological changes may be due to differences in types of cancers and carcinogens) and progression of cancers. Most of the data in the paper are from *in vitro* cell cultures and animal experiments.

AUTHOR: CH'EN Lien-chung [7115 6647 0112]

ORG: Institute of Atomic Energy, Chinese Academy of Sciences

TITLE: "Applications of Neutron Activation Analysis in Atmospheric Pollution Research"

SOURCE: Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN  
[Progress in Biochemistry and Biophysics] in Chinese No 2, Apr 77  
pp 38-42

ABSTRACT: Paper provides a brief introduction to the wide range of typical applications of neutron activation analysis technology in environmental pollution research, including analysis of atmospheric and water contamination and the applications of activated radioactive and non-radioactive tracers in pollution studies. Primarily a survey of foreign developments.

AUTHOR: T'U Kuang-ch'ou [3205 0342 0321]

ORG: Institute of Zoology, Yunnan Province

TITLE: "Biochemistry of Snake Venoms, Snakebite Treatment, and Utilization of Snake Venoms"

SOURCE: Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN  
[Progress in Biochemistry and Biophysics] in Chinese No 2, Apr 77  
pp 43-48, inside back cover

ABSTRACT: Emphasis is given to providing data from recent Chinese studies of snakebite treatment and pharmacological and biochemical studies of snake venoms for reference use by clinicians and researchers. Discussion of neurotoxins covers cobra and seasnake venom neurotoxins, banded krait venom  $\alpha$ - and  $\beta$ -bungarotoxins, and neurotoxins of Viperidae and Agkistrodon (crototoxin, crotamine, convulxin, and viperotoxin), as well as the relationship between molecular structure and function. Discussion of membrane-active polypeptides (MAP) covers chemical composition and structure, the relationship between structure and function, and effects on cell membranes. The section on venom enzymes discussed 14 enzymes. Good treatment efficacy is claimed for several snakebite remedies based

[continuation of SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN  
No 2, Apr 77 pp 43-48, inside back cover]

on traditional medical principles developed in various localities since the Cultural Revolution. Other applications of venom components in chemical and medical research, such as application of venom MAP in studies of cell membrane structure and function and in tumor research, use of cobra venom to alleviate severe pain, and treatment of coronary disease are briefly mentioned. Considerable work in these and other related areas is currently being done in China.

AUTHOR: None

ORG: None

TITLE: "Ion Chromatography: A New Technique in Clinical Chemistry"

SOURCE: Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN  
[Progress in Biochemistry and Biophysics] in Chinese No 2, Apr 77  
inside front cover

ABSTRACT: Brief description of ion chromatography. Abstracted  
from Clin. Chem., 22, 9, 1976.

AUTHORS: KU Kuo-yen [7357 0948 1750]  
LIU Li [0491 7812]  
HUNG Lung-sheng [3163 7893 3932]  
LI Mei-fang [0632 2734 5364]

ORG: All of Shanghai Institute of Experimental Biology

TITLE: "Methodological Study of AFP Emulsion Agglutination Deter-  
mination"

SOURCE: Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN  
[Progress in Biochemistry and Biophysics] in Chinese No 3, Jun 77  
pp 5-10

ABSTRACT: The paper introduces methods of AFP emulsion of agglutination determination. Blood (serum or whole) is diluted with lithium carbonate--sodium hydrogen carbonate--sodium chloride solution, then reacted with purified lapinized human AFP antiserum sensitized emulsion, which can prevent or reduce non-specific agglutination. It is possible to determine 1~2  $\mu$ g/ml serum AFP. Even though blood samples to be tested contain emulsion agglutination factors which inhibit emulsion agglutination, they also contain factors which promote emulsion agglutination. Discussion of the principles of

[continuation of SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN No 3, Jun 77  
pp 5-10]

the emulsion agglutination reaction, combined diluents, and blood-serum inhibitive and promotive factors is presented.

The authors acknowledge the energetic assistance of such units as the Laboratory Testing Group of Sixth People's Hospital, Shanghai Municipality; Hematogeny Group of the Biological Products Institute, Shanghai Municipality; Chung-shan College of Medicine, First Hospital, Shanghai Municipality; as well as comrades YANG Cheng-hung [2799 2973 3163], SHIH Wei-k'ang [2457 3262 1660], et al.

**AUTHOR:** None

**ORG:** Third Teaching and Research Group, Department of Hygiene, Soochow College of Medicine

**TITLE:** "Effects of Ionizing Radiation on Human Blood and Lymph Cell Transformation Energy"

**SOURCE:** Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN [Progress in Biochemistry and Biophysics] in Chinese No 3, Apr 77 pp 10-14

**ABSTRACT:** Experiments described in this paper involved x-ray and  $^{60}\text{Co}$   $\gamma$ -ray irradiation of human blood cells in vitro, with  $^3\text{H}$ -thymidine as DNA adulterant in post-irradiation cultures. A liquid scintillation counter was used to measure  $^3\text{H}$ -thymidine radioactivity and determine post-irradiation dosage-effectiveness to facilitate further study of the laws of irradiation-induced changes. 25r irradiation causes a reduction of  $^3\text{H}$ -thymidine adulterant; 65r or more leads to a decrease of lymph cell transformation energy distinctly different in comparison with the control group. There is a semilogarithmic linear relationship between radiation dosage and effectiveness. In vitro irradiation dosages causing 50 percent

[continuation of SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN  
No 3, Apr 77 pp 10-14]

inhibition of  $^3\text{H}$ -thymidine adulterant were 300-400r for x rays and 250-300r for  $\gamma$  rays.

Paper received 20 Oct 75.

AUTHORS: SU Liao-yuan [5685 3598 0626]  
LIN Hsing-ch'eng [2651 5281 2052]  
LIU K'o-liang [0491 0344 5328]  
WANG T'ao [3076 3447]

ORG: All of Third Teaching and Research Group, Department of Hygiene, Soochow College of Medicine

TITLE: "Application of  $^3\text{H}$ -Thymidine in Determination of Lymph Cell Transformation"

SOURCE: Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN  
[Progress in Biochemistry and Biophysics] in Chinese No 3, Apr 77  
pp 14-16

TRANSLATION OF CHINESE ABSTRACT: This paper introduces a method of DNA synthesis determination which utilizes minute quantities of blood: 0.1 ml heparin anticoagulant blood is perfused into 3 ml PHA-containing Fagle's liquid growth culture medium; after culturing for 54 hrs, 0.6  $\mu$ curie of  $^3\text{H}$ -TdR is injected, and culturing continues for 16 hrs. Top serum is pipetted and discarded, and two washes with normal saline and one wash with 5 percent trichloroacetic acid are used for precipitation. Then 0.5 ml 5 percent trichloroacetic

[continuation of SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN  
No 3, Apr 77 pp 14-16]

acid is added to the precipitate, which is placed in a 90 degrees C water-bath for 15 minutes, and after centrifugation, 0.2 ml top serum is placed in 5 ml scintillation liquid for measurement. Formula for scintillation liquid: PPO 3 g, POPOP 0.4 naphthalene g, 110 g, dioxane 1000 ml. In blood from 10 healthy persons, average  $^3\text{H-TdR}$  mixing rate was 10.8 percent.

Paper received 21 Oct 75.

AUTHOR: None

ORG: Basic Research Labs of Institute of Cardiovascular Disease and Fu-wai Hospital, Chinese Academy of Sciences

TITLE: "Simple and Easy Method for Constant-Temperature Constant-Pressure Perfusion of Rat Heart In Vitro"

SOURCE: Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN [Progress in Biochemistry and Biophysics] in Chinese No 3, Apr 77 pp 17-19

ABSTRACT: In order to observe the direct action of Chinese traditional medicines on the heart and the effects of anoxia, authors have devised a simple method for perfusion of rat hearts in vitro. Equipment required is simple and convenient to operate, and it is possible to both observe heart constriction amplitude and coronary artery flow rate as well as conduct chemical determination of its content simultaneously. The perfusion device, perfusion solutions, and surgical techniques are described.

Paper received 23 Nov 76.

AUTHOR: None

ORG: None

TITLE: "Using Ultrasonic Waves to Study Human Tissues"

SOURCE: Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN  
[Progress in Biochemistry and Biophysics] in Chinese No 3, Apr 77  
p 19

ABSTRACT: Brief filler item describing use of ultrasonic waves in  
place of x-ray perspectives.

AUTHOR: None

ORG: Genetic Engineering Group, Shanghai Institute of Biochemistry,  
Chinese Academy of Sciences

TITLE: "Genetic Engineering"

SOURCE: Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN  
[Progress in Biochemistry and Biophysics] in Chinese No 3, Apr 77  
pp 20-26

ABSTRACT: General introduction to genetics and chromosome DNA; re-  
capitulation of recent developmental history and achievements in  
genetic engineering. Discussion of genetic transfer between pro-  
karyotes, from eukaryotes to prokaryotes, from prokaryotes to eu-  
karyotes, and transfer of genetic material between eukaryotic cells.  
Brief survey of some questions for the further future development  
of genetic engineering work, and comment on the recombinant-DNA  
controversy.

Paper received 13 May 76.

AUTHOR: None

ORG: None

TITLE: "News of Republication Abroad of Chinese Synthesis of Glucagon"

SOURCE: Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN [Progress in Biochemistry and Biophysics] in Chinese No 3, Apr 77 p 26

TRANSLATION OF CHINESE TEXT: Glucagon is a hormone playing an important role in the control of glucose metabolism. The English edition of CHUNG-KUO K'U-HSUEH [Scientia Sinica] No 6, 1975, published the report "Total Synthesis of Crystalline Glucagon by the Method of Solid-Phase Condensation of Fragments" by the Synthetic Protein Research Group, Shanghai Institute of Biochemistry, Chinese Academy of Sciences. This is a new achievement of this research group obtained through the Great Proletarian Cultural Revolution, a follow-up to their synthesis of insulin in 1965.

AUTHOR: SUN Yu-k'un [1327 3768 2402]

ORG: Shanghai Institute of Biochemistry, Chinese Academy of Sciences

TITLE: "Discussion of Treatment of Tumors and Viruses Through Studies of Nucleic Acid Synthesis Repressors"

SOURCE: Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN [Progress in Biochemistry and Biophysics] in Chinese No 3, Apr 77 pp 27-37

ABSTRACT: Wide-ranging discussion and descriptive survey of work dealing with suppression of nucleic acid synthesis in the context of anti-tumor drugs (nucleotide derivatives, transition-state repressors, folic acid antimetabolites, and effects on template DNA) and anti-viral drugs in relation to the double- and single-chain DNA and RNA viruses of numerous diseases such as smallpox, infantile paralysis, rabies, influenza, and so on.

Paper received 27 Jan 76.

AUTHOR: CH'EN Wei-ch'ang [7115 1919 2490]

ORG: Inner Mongolian College of Medicine

TITLE: "Applications of Computers in Modern Medicine"

SOURCE: Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN [Progress in Biochemistry and Biophysics] in Chinese No 3, Apr 77 pp 37-43

ABSTRACT: Comprehensive review and discussion of foreign applications and programming strategies in computer processing of medical records and data, medical image processing, applications of computers in carrying out automatic medical diagnosis (theory and basic concepts of improbability- and probability-type diagnostic programming), and suggestions for future development, including application of image input and processing methods to 'tongue diagnostics' and 'pulse perspectives' of traditional Chinese medicine and combining Western diagnostic theory with the clinical experience of traditional medicine to derive logical models for traditional diagnostics.

Paper received 28 Aug 76.

AUTHOR: SHIH Yu-liang [2457 3768 2856]

ORG: Shanghai Institute of Physiology

TITLE: Functional Mechanism of Botulinum Toxin (I)"

SOURCE: Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN [Progress in Biochemistry and Biophysics] in Chinese No 3, Apr 77 pp 44-47

ABSTRACT: Presented are brief descriptions of studies (mostly foreign) at the cellular and molecular levels concerning the blocking effect of botulinum toxin at nerve-muscle junctions, omitting effects of botulinum toxin on various systems and clinical aspects. Topics discussed include neural and muscular insensitivity to botulinum toxin and effects of botulinum toxin on acetylcholine sensitivity and electrical activity in nerve endings.

AUTHOR: FANG Sheng [2455 0524]

ORG: Institute of Biophysics, Chinese Academy of Sciences

TITLE: "Brief Introduction to Bionics"

SOURCE: Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN  
[Progress in Biochemistry and Biophysics] in Chinese No 3, Apr 77  
p 48, inside back cover, inside front cover

ABSTRACT: Brief mention of bionics in early history (China's Lu Pan [7627 3803] [c. 500 B.C.], who invented the first toothed saw after having cut his finger on the serrated edge of a blade of grass, and Leonardo Da Vinci) followed by short illustrative descriptions of post-1960 developments such as electronic circuits, compound 'fly-eye' lenses, devices which keep airports clear of birds by playing recorded avian cries of alarm, electronic models of frog and pigeon eyes, decision-making and 'conversing' robots, artificial intelligence and neurobionics research, and many other examples.

Paper received 24 Dec 75.

AUTHOR: None

ORG: None

TITLE: "Using UHF Electromagnetic Fields to Clear Fields of Weeds"

SOURCE: Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN  
[Progress in Biochemistry and Biophysics] in Chinese No 3, Apr 77  
inside front cover

ABSTRACT: UHF electromagnetic fields of 183 joules/cm<sup>3</sup> used before the seedling stage can eliminate all weeds and grass seedlings. Broad-leaved weeds are more sensitive to the magnetic field than are graminaceous plants, and stalks are more sensitive than seedlings. Different soil and weather conditions may influence the effective magnetic field strength. This may be a weeding method worthy of further study.

AUTHOR: None

ORG: None

TITLE: "Luminescent Medusa"

SOURCE: Peking SHENG-WU HUA-HSUEH YU SHENG-WU WU-LI CHIN-CHAN  
[Progress in Biochemistry and Biophysics] in Chinese No 3, Apr 77  
inside front cover

ABSTRACT: Report of extraction of 125 mg of luminescent protein  
from 450,000 luminescent medusa. Protein emits blue light upon  
encountering  $\text{Ca}^{+2}$ . From this protein 1 mg of luminescent mole-  
cules--aminopyrazine rings--were extracted. Each molecule emits  
70 kilocalories of light energy. How luminescent molecules can  
store such great energy has not yet been ascertained.

11310

CSO: 4009

ACTA BOTANICA SINICA

AUTHOR: None

ORG: Institute of Maize Research, Kuang-hsi Chuang Autonomous Region, Experimental Station of Tung Pei Wang Commune, Hai-tien, Peking and Peking Institute of Botany, Academia Sinica

TITLE: "Studies on Maize Anther Culture"

SOURCE: Peking CHIH-WU HSUEH-PAO [ACTA BOTANICA SINICA] in Chinese Vol 19 No 2, Jun 77 pp 89-94

TEXT OF ENGLISH ABSTRACT: Callus has been induced from maize anther culture in 30 different materials and haploid seedlings have been differentiated in 15 of them. When the anther with the uninucleate pollen grains at the middle stage was inoculated, the induction frequency of haploid callus (or embryoid) was the highest, reaching 3.25 percent, and this was 3.92 times of increase in comparison with the pollen grains at the stage of side-located uninucleus. The culture medium for inducing callus is  $N_6 + K 2,4-D 2 \text{ mg/l} + 1 \text{ mg/l} + CH 500 \text{ mg/l}$ , and that for differentiation is  $N_6 + K 1 \text{ mg/l} + CH 500 \text{ mg/l}$ .

[Continuation of CHIH-WU HSUEH-PAO Vol 19 No 2, 1977 pp 89-94]

2-or 4-celled pollen grains and multicellular masses have been observed in squashed anthers. Root tip squash revealed that the chromosome number was 10 and this proved that the haploid plantlet was derived from the pollen grain. The haploid plantlets have been transplanted in the soil and then treated with colchicine solution at the concentration of 0.025-0.05 percent for doubling the chromosome number and the plantlets grew normally. Now the first batch of transplanted plants is in heading and silking stage.

AUTHOR: None

ORG: Scientific Research Group, Pei Ts'un Production Team, Ta Liang Commune, Shun Te County and Research Group of Phytohormone, Laboratory of Physiology and Biochemistry, Kuang-tung Institute of Botany

TITLE: "Studies on Raising Yield of Rice and Related Physiological Role Under Gibberellin Treatment at Late Growth Period of Rice"

SOURCE: Peking CHIH-WU HSUEH-PAO [ACTA BOTANICA SINICA] in Chinese Vol 19 No 2, Jun 77 pp 95-102

TEXT OF ENGLISH ABSTRACT: Our "three in one" research group studied the effect of gibberellin on the yields of rice in many experimental plots for several times. We raised the yield of rice by 5-10 percent by treatment with gibberellin at late growth period of rice. Amount of gibberellin applied was 20 ppm for early season rice and 30 ppm for late season rice.

We studied the effect of gibberellin on the growth dynamic of stems, leaves and panicles, the change of photosynthesis and respiration rates, the rule of translocation, distribution and accumulation of materials in various above ground parts. We also studied the dynamics of grain filling, the rate of oxidative phosphorylation and the activities of the enzymes of starch synthesis and starch hydrolysis

[continuation of CHIH-WU HSUEH-PAO Vol 19 No 2, 1977 pp 95-102]

during grain filling period.

Based upon the above mentioned results, we explained the high yield theory basis of gibberellin treatment.

AUTHOR: None

ORG: Faculty of Botany and Plant Physiology, Department of Agronomy, Chiang-hsi Communist University

TITLE: "The Relationship Between Male Sterility of Rice and Activities of Some Enzymes and Rate of Respiration in Pollen"

SOURCE: Peking CHIH-WU HSUEH-PAO [ACTA BOTANICA SINICA] in Chinese Vol 19 No 2, Jun 77 pp 103-106

TEXT OF ENGLISH ABSTRACT: 1. The present paper deals with the contents of starch and protein, and the activities of four enzymes in the pollen of male sterile and maintainer lines in rice at different developmental stages by means of histochemical methods.

Experimental results showed that in various developmental stages of pollen, especially in binucleate stage, the activities of cytochrome oxidase, polyphenol oxidase and ATP-ase in male sterile line were lower than those in maintainer line. The activity of peroxidase of male sterile line was higher than that of the maintainer in uninucleate stage. After the binucleate stage, the enzyme activity of male sterile line was much lower than that in the maintainer.

[continuation of CHIH-WU HSUEH-PAO Vol 19 No 2, 1977 pp 103-106]

2. At various developmental stages, the rate of respiration of anthers of male sterile line was lower than that of the maintainer. After heading, the rate of respiration of male sterile line was increased.

3. After the binucleate stage, especially in the trinucleate stage, hydrogen peroxide was accumulated in pollen of male sterile line, but in the maintainer there is no accumulation of hydrogen peroxide at all developmental stages.

4. After the binucleate stage, the activities of these four enzymes and the contents of starch and protein may be used as indices of pollen fertility.

We used Hg-bromophenol blue method to detect the protein of sterile pollen which contains abundant starch. It is a simple and practical method for detecting pollen fertility.

AUTHOR: None

ORG: Research Group of Symbiotic Nitrogen Fixation, Laboratory of Nitrogen Fixation, Shanghai Institute of Plant Physiology

TITLE: "Investigations on Symbiotic Nitrogen Fixation of Non-Leguminous Plants. I. Nitrogen-Fixing Activities of Some Non-Leguminous Plants in China"

SOURCE: Peking CHIH-WU HSUEH-PAO [ACTA BOTANICA SINICA] in Chinese Vol 19 No 2, Jun 77 pp 107-113

TEXT OF ENGLISH ABSTRACT: The exploitation of symbiotic nitrogen fixation of non-leguminous plants has great potentiality in agricultural productive practice. Studies on the various types of symbiotic nitrogen fixation and their characteristics may provide some insight in extending the scope of symbiotic nitrogen fixation.

The acetylene reducing activities of root nodules or leaf nodules of the following plants, collected in the southern part of China, were detected by gas chromatography: 5 species of Elaeagnus, 6 spp. of Podocarpus, 2 spp. of Cycas, 1 sp. of Casuarina, 2 spp. of Pavetta and 4 spp. of Ardisia. The results indicate that the 5 species of Elaeagnus, 2 spp. of Cycas and 1 sp. of Casuarina have significant nitrogen fixing ability, among them the root nodulation and acetylene reducing activities of Vietnam elaeagnus (Elaeagnus sp.) and Cycas siamensis Miq. so far have not been reported.

[continuation of CHIH-WU HSUEH-PAO Vol 19 No 2, 1977 pp 107-113]

High acetylene reducing activities are found in the root nodules of Elaeagnus, e.g. the activities of root nodules of Elaeagnus pungens Thunb. may reach as high as 0.19 n mole  $C_2H_2$  reduced/mg. f. w/min. comparable to that of the leguminous plants.

AUTHOR: None

ORG: The Phytotron, Shanghai Institute of Plant Physiology

TITLE: "The Influence of High Temperature on Flowering and Fruiting of Early Rice and Its Control. III. The Sensitivity of Flowering and Fruiting of Early Rice To High Temperature Injury"

SOURCE: Peking CHIH-WU HSUEH-PAO [ACTA BOTANICA SINICA] in Chinese Vol 19 No 2, Jun 77 pp 126-131

TEXT OF ENGLISH ABSTRACT: This experiment is about the sensitivity of the flowering and fruiting of early rice to high temperature (35 degrees C) injury. It was carried out in the phytotron.

There is a stage of most sensitivity to high temperature injury during the flowering and fruiting period in early rice. In other words, there is a stage when the injury caused by high temperature is most serious. But the sensitive stages of empty grain, unfilled grain and kilogram weight are different.

The high temperature injury mainly results in the increase of the percentage of empty grain during the flowering of early rice. The stage most sensitive to high temperature, for the spikelet, is one day before the flowering; for the panicle, or the stand in the paddy field, one day before full bloom.

continuation of CHIH-WU HSUEH-PAO Vol 19 No 2, 1977 pp 126-131

It is possible to take measures for prevention of high temperature injury in time, if we know the stage most sensitive to high temperature, the dates of high temperature and the developmental stage of rice in paddy fields.

AUTHOR: None

ORG: Research Group of Blue-green Algae Application, 5th Laboratory, Hu-pei Institute of Hydrobiology

TITLE: "Cultivation of Sturdy Rice Seedlings By Using Nitrogen Fixing Blue-Green Algae"\*

SOURCE: Peking CHIH-WU HSUEH-PAO [ACTA BOTANICA SINICA] in Chinese Vol 19 No 2, Jun 77 pp 132-137

TEXT OF ENGLISH ABSTRACT: Introduction of nitrogen fixing blue-green algae in rice seedling beds may result in sturdy rice seedlings. After transplantation, the recovering period was made earlier for 1-2 days and the time of effective tillering was prolonged for 1-3 days. As a result, the number of ears, ear length and average grains of each ear all increased. The average year per mu in the experimental plots of early and late rice were increased by 7.68 percent and 9.3 percent respectively. So it is considered that nitrogen fixing blue-green algae as a fertilizer source will be of developmental prospect.

\*Field testing of the work in the present article was carried out in cooperation with the Hsien-ning Regional Scientific Committee, Hu-pei Province, the testing station of Ssu-hung brigade, Ma-ch'iao Commune in Hsien-ning County, the agricultural sciences office, Ch'un-li brigade, Heng-kou Commune, the agricultural

[Continuation of CHIH-WU HSUEH-PAO Vol 19 No 2, 1977 pp 132-137]

sciences office of Hua-jung Commune, O-ch'eng County, the microbiology test station of Chia-yu County, the Ch'i-ch'un County Bureau of Science and Technology and the county scientific testing station, the Ko-ming and Yung-hung brigades of Hsin-sheng-huo Commune, the agricultural sciences office of Ch'ing-shui-ho Commune, the agricultural sciences office of Shih-tzu Commune, Ch'i-chun Normal School, and the Wu Han Municipal Tung Hsi Hu San T'ien Farm Testing Station, etc., and was compiled and edited by the Research Group of Blue-green Algae Application, 5th Laboratory, Hu-pei Institute of Hydrobiology.

AUTHOR: TENG Ken-yun [6772 2704 0061]  
CHENG Ta-wei [6774 1129 3837]

ORG: Peking Academy of Agriculture

TITLE: "Further Discussion On the Relation Between Tillering Capacity and Cumulative Temperature and Its Application in Wheat Culture--Discussion with Comrade WANG Shih-ch'i [3769 0013 5075]"

SOURCE: Peking CHIH-WU HSUEH-PAO [ACTA BOTANICA SINICA] in Chinese Vol 19 No 2, Jun 77 pp 156-160

TEXT OF ENGLISH ABSTRACT: This paper attempts to discuss the problem of the tillering function in wheat from the viewpoint of materialist dialectics, and indicates that the tillering function should include the relation between the number of tillers and leaf-age of wheat under various conditions, so that it should include a parameter reflecting objective conditions. Such a function may be derived from the basic law of the tillering process, that is, the tillering rate is in direct proportion to number of tillers. This paper also indicates that the tillering function expressed by Fibonacci series is unreasonable, and discusses the applicable significance of the relation between number of tillers and cumulative temperature.

AUTHOR: None

ORG: Agricultural Experimental Station, "Wu Ssu" National Farm, Shanghai and Ethylene Research Group, Laboratory of Phytohormone, Shanghai Institute of Plant Physiology

TITLE: "Application of Ethrel to Promote the Ripening of Sea-island Cotton"

SOURCE: Peking CHIH-WU HSUEH-PAO [ACTA BOTANICA SINICA] in Chinese Vol 19 No 2, Jun 77 pp 163-165

ABSTRACT: The relatively long maturation period of sea-island cotton, Gossypium barbadense L., has served to limit its full utilization. Recent tests in Shanghai indicate that maturation of sea-island cotton may be hastened in direct proportion to the concentration of ethrel applied. Furthermore, there are indications that treatment may enhance the quality of the cotton, specifically the fiber length.

AUTHOR: None

ORG: Laboratory of Crop Ecological and Genetics, Agronomy Department, Kuangtung College of Agriculture and Forestry

TITLE: "Determination of Photorespiration"

SOURCE: Peking CHIH-WU HSUEH-PAO [ACTA BOTANICA SINICA] in Chinese Vol 19 No 2, Jun 77 p 166

ABSTRACT: Recently we have used an infrared  $\text{CO}_2$  analyzer to carry out preliminary investigations on photorespiration. It has been determined that the former division of plants into photorespirators and non-photorespirators was not sufficiently accurate, and that a more appropriate designation based on the amount of  $\text{CO}_2$  emitted under light would be high-photorespirators and low-photorespirators.

8650

C50: 4009

ACTA GENETICA SINICA

AUTHOR: WU An-chieu [0702 1344 0036]

ORG: Technique Staff of San-t'ai Commune Fu County, Liaoning Province

TITLE: "Proceed in Struggle, Bring up Superior Seeds for the Revolution"

SOURCE: Peking I-CH'UAN HSUEH-PAO [ACTA GENETICA SINICA] in Chinese Vol 4, No 1, Mar 77 pp 6-11

TEXT OF ENGLISH ABSTRACT:

Maize is one of the main cereal crops in Lata District and which carries a big weight in the outup of food supply for the locality. Since 1963, I have dedicated myself to the work of corn breeding. After practicing the three great revolutionary movement, in the year of 1970, I have succeeded in brought up a new variety "Lü-feng No. 1" by crossing two self-bred lines "Fu-bai 35" and "330" which manifested itself with well adaptation, pest resistant, fine grain quality and stable increasing yield. The variety is now bring about harvest of 1,100 catties per mou.

AUTHOR: FANG Tsung-hsi [2455 1350 3556]  
CHIANG Nai-o [3068 0035 5501]

ORG: Department of Biology, Shantung College of Oceanology

TITLE: "Necessity and Chance in Mutations (a second criticism on Monod's 'Chance and Necessity'))"

SOURCE: Peking I-CH'UAN HSUEH-PAO [ACTA GENETICA SINICA] in Chinese Vol 4, No 1, Mar 77 pp 12-21

TEXT OF ENGLISH ABSTRACT:

According to Monod, the so-called reproductive invariance of living beings rests on the reproduction of invariant informations stored in the genetic material DNA, and the initial elementary events which open the way to organic evolution are microscopic changes or molecular disturbances which result in mutations. So he insists that it is chance that is the basis of mutations and organic evolution.

The present writers disagree with this metaphysical point of view and point out that Monod's reasoning is very superficial. According to the present writers, the ability of genes to mutate rests on the divisibility of the genetic material. Without this fundamental property no gene can change. As we now know, the genetic informations consist of genetic codes each of which is made up of three "letters". These "letters" are chemical compounds which can react with suitable agents happened to

be present in the surrounding environment. If the genetic material is not divisible and possesses no property of mutability, there will be no mutation at all. As the genetic material contains definite and mutable informations, it will sooner or later result in mutations. That is to say, that the genetic material will undergo changes is a certainty. So the basis of mutations is necessity and mutation happens under the control of natural laws.

According to dialectical materialism, necessity and chance are inter-related and intertransformed under certain circumstances. There is neither pure necessity nor pure chance. Mutations as a phenomenon appear to be accidents which are expressions of underlying laws operating on the genetic material. So the accidental is necessity, and necessity is also accidental.

AUTHOR: T'IEN P'ei-chan [3944 0160 0594]

ORG: Research Institute of Plant Selection, Kirin Academy of Agricultural Sciences

TITLE: "Soy Leaf Forms as an Object of Selection"

SOURCE: Peking I-CH'UAN HSUEH-PAO [ACTA GENETICA SINICA] in Chinese Vol 4, No 1, Mar 77 pp 22-30

TEXT OF RUSSIAN ABSTRACT: We know that soil fertility exerts a significant influence on leaf forms. Our observations show that soy leaf forms depend on both the fertility of the soil and light conditions, that is, on the total number of hours of light in vegetation.

We presume that soyleaf forms as an ecological characteristic are determined by the relation of light to soil fertility. Under poor conditions of light and good soil fertility, a small-leaf ecotype is formed, while, on the other hand, with good light and poor soil fertility, a large-leaf ecotype is formed.

In addition, the question elucidated was of the relation of the form of soy leaves to other physiological characteristics, such, for example, as the productivity of photosynthesis and the coefficient of leaf surface, and so on.

AUTHOR: None

ORG: 406 Research Group, Institute of Genetics Chinese Academy of Science

TITLE: "Studies on Interspecific Hybridization in Cotton"

SOURCE: Peking I-CH'UAN HSUEH-PAO [ACTA GENETICS SINICA] in Chinese Vol 4, No 1, Mar 77 pp 31-41

TEXT OF ENGLISH ABSTRACT: Since 1973, reciprocal crosses of 21 combinations between 26-genomes (*Gossypium hirsutum*, *G. barbadense*) and 13-genomes (*G. arboreum*; *G. herbaceum*) were tested to overcome the low seed set of interspecific hybrids and the sterility of *F*<sub>1</sub> plants. The results of the experiments are as follows:

(1) The aqueous solutions of GA 50 ppm and NAA 40-320 ppm were alternatively sprayed on the hybrid bolls at the very beginning of the crosses once per day, and 5 times for each was appropriate. The bollset reached more than 90 percent. Average of well differentiated hybrid embryos per boll was 2.3-3.6.

(2) The small hybrid embryos were cultured in vitro, and plantlets were grown in the test tubes. The survival rate of plantlets in test tubes was 80 percent, and that of which was 40 percent when transferred in pots during the spring and

[continuation of I-CH'UAN HSUEH-PAO Vol 4, No 1, Mar 77 pp 31-41]

summer experiments in 1975. A total number of 66 plants of interspecific hybrids between 26-genomes and 13-genomes were obtained by this method. These plants showed morphologically typical interspecific hybrid features. Both male and female gametes were sterile, and the chromosome number of the root tip cells was 39.

(3) In 1975, 10 ppm colchicine was added to the medium in order to increase the effect of colchicine treatment, to advance its date, and to simplify its procedures. Colchicine treatment was carried throughout the culture period. The hybrid plantlets, growing very well in tubes, had sturdy roots and stems, and dark green leaves. The survival rate in the test tube and that of being transplanted were higher than those in the absence of colchicine treatment. The rate of fertility restoration of the *F*<sub>1</sub> plants was 100 percent. *F*<sub>1</sub> plant were planted in pots more than 3 months in winter. Average of bolls per plant: 4. Average of seeds in large size per boll: 4.8. Germination power of seed: strong. Germination rate: more than 95 percent. Crosses could be done in the same year by this method fertile *F*<sub>1</sub> plant obtained, and *F*<sub>2</sub> seeds from *F*<sub>1</sub> plant or seeds of backcross received. In the following year, observations and selections could be started in field.

AUTHOR: None

ORG: Plant Breeding Group, Department of Agronomy, Hua-chung Agricultural College

TITLE: "The Utilization of the Hybrid Vigor for the Self-Incompatible Hybrids in *Brassica Napus L.*"

SOURCE: Peking I-CH'UAN HSUEH-PAO [ACTA GENETICA SINICA] in Chinese Vol 4, No 1, Mar 77 pp 42-48

TEXT OF ENGLISH ABSTRACT:

Since the spring of 1972, we have started our work about the investigation of the utilization of the hybrid vigor for the self-incompatible hybrids produced from the selfing and the selection of the  $F_1$  to  $F_2$  offsprings from the interspecies of *Brassica napus L.* and *Brassica chinensis L.*, as well as from the selfing and the selection of the offspring from  $Co^{60}$  treatment.

Now, several hybrids have already been released for the test of the production in the people's communes. The self-incompatible lines, such as 74-211, 75-219 etc. can be used for the production of the self-incompatible hybrids. The index of compatibility ( $= \frac{\text{No. of seeds produced}}{\text{No. of flowers treated}}$ , or No. of seeds per flower) of these lines are lower than that which produced by artificial selfing, and also by artificial sib-selfing within these lines. But, during crossing with the suitable varieties, they

[continuation of I-CH'UAN HSUEH-PAO Vol 4, No 1, Mar 77 pp 42-48]

tend to produce the normal seeds as the ordinary varieties, but the yield of these hybrids will surmount the yield of the ordinary varieties by 30—50 per cent.

Through the hand-selfing of the flower buds about 2—4 days before flowering, these incompatible lines can be easily conserved for the next step for the production of hybrid seeds. With the suitable isolation of the field, the production of hybrid seeds can be conducted by 1:1 ration for the incompatible line as female parent and certain suitable variety as male parent produced by several generations of selfing.

The study of the genetics and the breeding behavior of these incompatible lines has been started. The investigation of different ways to use the incompatible lines will be continued.

AUTHOR: None

ORG: Group of Tree Breeding, North Eastern Forestry Academy

TITLE: "Induction of Haploid Poplar Plantlets from Pollen"

SOURCE: Peking I-CH'UAN HSUEH-PAO [ACTA GENETICA SINICA] in Chinese Vol 4, No 1, Mar 77 pp 49-54

TEXT OF ENGLISH ABSTRACT:

Haploid poplar plantlets were successfully induced from *Populus berolinensis* Dippel. and three poplar hybrids—*P. simonii* Carr.  $\times$  *P. nigra* L., *P. harbinensis* Wang et Skv.  $\times$  *P. pyramidalis* Borkh. and *P. canadensis* Moench.  $\times$  *P. koreana* Rehd. The anthers of above mentioned species were cultured *in vitro* on synthetic medium. The results were summarized as follows:

1. The suitable medium for inducing callus from poplar anthers had been found to be MS + 2,4-D 2 ppm + Kinetin 2 ppm. The frequency of callus induced was 3.8 percent.
2. It was found that the medium MS supplemented with BAP (N<sup>6</sup>-Benzylaminopurine) 1—2 ppm plus NAA 0.2—0.5 ppm and the sucrose concentration was reduced to be 1.5—2.0 percent, which could be available to the anther callus of poplar differentiable green plantlets. The differentiation frequency of plantlets was 69 percent.

[continuation of I-CH'UAN HSUEH-PAO Vol 4, No 1, Mar 77 pp 49-54]

3. The contents of inorganic macroelements in the MS medium had to be reduced to  $\frac{1}{2}$ , then, supplemented with NAA 0.8 ppm and IAA 0.2 ppm, which kind of medium was very suitable for root-system formation in plantlets. In this medium it was not only beneficial for the induction of root-formation, but also very efficient for root-system development.

4. The haploid poplar plantlets from pollen had been transplanted into green-hause and directly planted into the pots. Up to present, they are growing satisfactorily.

AUTHOR: None

ORG: 102 Research Group, Institute of Genetics, Chinese Academy of Science; Department of Medicine, Peking Children's Hospital; 102 Research Group, Institute of Psychology, Chinese Academy of Science; Department of Neurology, Peking Capital Hospital; Division of Brain Disease, Kuang-an-men Hospital, Institute of Chinese Traditional Medicine

TITLE: "A Chromosomal Survey of One Hundred and Fifty-five Mentally Retarded Children in Peking"

SOURCE: Peking I-CH'UAN HSUEH-PAO [ACTA GENETICA SINICA] in Chinese Vol 4, No 1, Mar 77 pp 55-62

TEXT OF ENGLISH ABSTRACT:

One hundred and fifty-five children in Peking with mental retardation were examined karyologically with the aid of peripheral blood culture techniques. A total of 74 patients were found to have abnormal karyotypes. The results of chromosome analysis are as follows:

1. Forty patients had the clinical and cytogenetic features of Down's syndrome, of which 36 were trisomic for chromosome 21 [47, XX (or XY), + 21]; 2 were translocation between D group and G group [46, XX, - D, + t(Dq Gq)]; 2 were translocation between G group and G group [46, XX (or XY), - G, + t(Gq Gq)].

[continuation of I-CH'UAN HSUEH-PAO Vol 4, No 1, Mar 77 pp 55-62]

2. 2 patients had trisomic 18 [47, XX, + 18].
3. 7 had large short arm of G group [46, XX (or XY), Gp +].
4. 1 had translocation of long arm in E group chromosome [46, XY, Eq +].
5. 1 had large short arm of a D group [46, XX, Dp +].
6. 1 had translocation of long arm in a G group [46, XY, Gq +].
7. 1 had an extra small chromosome of the G group [47, XY, + Gq -].
8. 21 had large Y chromosome [46, XYq +].
9. 81 had normal chromosome complements [46, XX (or XY)].

The clinical and cytogenetic characteristics of the patients were described, the relationships between chromosomal abnormality and mental retardation were discussed.

AUTHOR: None

ORG: Worker-Peasant-Soldier Students, Group of Genetics, Department of Biology,  
Hopeh Normal University

TITLE: "Preliminary Analysis of Heredity of Early Maturity in Hybrids (F<sub>1</sub>,  
F<sub>2</sub>) of Winter Wheat"

SOURCE; Peking I-CH'UAN HSUEH-PAO [ACTA GENETICS SINICA] in Chinese Vol 4,  
No 1, Mar 77 pp 63-71

TEXT OF ENGLISH ABSTRACT: Experiments indicated that early maturity of wheat  
belongs to quantitative characters. The heading stage of F<sub>1</sub> is intermediate  
with the tendency to early parents and with the heterosis average of -14.2  
percent in the crosses of parents with different growth and development  
periods. The heading stage of F<sub>2</sub> shows continuous variation and transgressive  
inheritance. The heritability of heading stage is remarkable, and has an  
average of 63.76 percent. There is a significant correlation between the  
average values of heading stages of F<sub>1</sub> and those of parents ( $r=0.767$ , re-  
gression coefficient=0.715). The parents with different growth and develop-  
ment periods have a remarkable influence on the progenies of hybrids. The  
general combinations of crosses have a greater effect for "early parents,"

[continuation of I-CH'UAN HSUEH-PAO Vol 4, No 1, Mar 77 pp 63-71]

however, to the constrictional effect of "late parents" attention should  
also be paid and not be neglected. The inheritance transmissions of early  
maturity are different with different parents. Attention shculd be paid  
to selections of early parents in breeding work. According to the law of  
inheritance of early maturity, most "early varieties" may be selected  
from "early parents" and "early varieties" may be selected from "late  
parents." The selection of early type in early generation of hybrids is  
effective.

AUTHOR: None

ORG: Laboratory of Silkworm Breeding, Department of Sericulture, Chekiang Agricultural Academy

TITLE: "Studies on Heritability and Selection of Some Quantitative Characters in Silkworm (*Bombyx Mori L.*)"

SOURCE: Peking I-CH'UAN HSUEH-PAO [ACTA GENETICA SINICA] in Chinese Vol 4, No 1, Mar 77 pp 72-77

TEXT OF ENGLISH ABSTRACT: 1. Silkworm heritability, in narrow sense, may be explained as several main economical characters possessed by silkworm, mating by method of hybrid backcrossing with their parents, and to get the sequent results be estimated. According to study, the order of heritability of the Chinese races' characters are arranged as follows: weight of cocoon filament (70.0 percent) > percentage of cocoon shell (65.0 percent) > length of cocoon filament (53.2 percent) > cocoon shell weight (51.6 percent) > cocoon weight (38.3 percent). And that of the Japanese races are: length of cocoon filament (76.7 percent) > percentage of cocoon shell (67.5 percent) > weight of cocoon filament (61.7 percent) > cocoon shell weight (57.7 percent) > cocoon weight (44.3 percent).

[continuation of I-CH'UAN HSUEH-PAO Vol 4, No 1, Mar 77 pp 72-77]

2. When selection of the larval duration tends toward short direction, some characters such as vitality of larva-pupa, cocoon yield per ten thousand larvae percentage of eclosin, percentage of good egg laying adult and number of eggs laid per adult seem to be the positive direction. But several characters such as cocoon weight and cocoon shell weight are tend to the negative direction. If selection of the larval duration tends toward the long direction, then the results are vice versa. While the characters such as percentage of cocoon shell, percentage of good egg and poor egg laying seem to be no influence to the selection of larval duration on either short or long directions.

3. When selection of the percentage of cocoon shell tends toward low direction, several characters such as vitality of larva-pupa, cocoon weight, cocoon yield of the thousand larvae, percentage of eclosin, number of eggs laid per adult and percentage of poor egg laying are tend to the positive direction. Nevertheless, duration of larvae, cocoon shell weight, percentage of good egg laying adult and percentage of good egg laid are tend to the negative direction. If selection of the percentage of cocoon shell tends toward high direction, then the results express exactly the opposite.

4. When selection of the cocoon weight tends toward light direction, then the characters such as vitality of larva-pupa, percentage of cocoon shell, cocoon

[continuation of I-CH'UAN HSUEH-PAO Vol 4, No 1, Mar 77 pp 72-77]

yield per ten thousand larvae, percentage of eclosin and percentage of good egg laying adult tend to the positive direction, and the larval duration, number of egg laid by each adult are tend to the negative direction. If selection of cocoon weight tends toward weight direction, then the results are exactly express the opposite. However, cocoon shell weight, percentage of good egg laying as well as poor egg laying express almost no effect when selection of the cocoon weight on either lighter or weight direction.

AUTHOR: None

ORG: Division of Plant Breeding, Department of Horticulture, Hopeh Agricultural University

TITLE: "A New Technique of Using Propionic-Iron-Carmine-Chloral Hydrate (PICCH) for Chromosome Staining in Vegetable Plants"

SOURCE: Peking I-CH'UAN HSUEH-PAO [ACTA GENETICA SINICA] in Chinese Vol 4, No 1, Mar 77 pp 82-84

TEXT OF ENGLISH ABSTRACT: In a study of small chromosomes of cucumber, pepper and tomato, the author has used a new combination of propionic-iron-carmine-chloral hydrate in a smear method.

This method is carried out in 4 steps. (1) The anthers of cucumber, pepper and tomato are fixed for 12-24 hours in a 6:3:1 mixture of 95 percent ethanol, chloroform and iron-propionic acid. The later is a saturated solution of freshly prepared and dried  $Fe(OH)_3$  in propionic acid. (2) The stain is prepared by adding 2 g of chloral hydrate to 5 ml of 0.5 percent propionic-carmine with a few drops of saturated solution of  $Fe(OH)_3$  in propionic acid. (3) After fixation, the material is either put away in 70 percent ethanol

[continuation of I-CH'UAN HSUEH-PAO Vol 4, No 1, Mar 77 pp 82-84]

for the later use, or is washed several times with 95 percent ethanol to be stained immediately. (4) After washing, a few anthers are brought to a slide with 1-2 drops of the stain and smeared, then the preparation is covered with a cover-glass and sealed with paraffin for 12-24 hours. Finally, the paraffin is removed and the slide is passed through a 1:1 mixture of n-butanol and pure acetic acid, pure n-butanol and mounted in Euparal.

The chromosomes are stained a brilliant purple against a clean background. The staining action on large chromosomes, such as those of *Allium cepa* has also been studied.

AUTHOR: CH'U T'ien [2806 1131]

ORG: None

TITLE: "Genetics and Glass Struggle--Pages from the History of Genetics"

SOURCE: Peking I-CH'UAN HSUEH-PAO [ACTA GENETICA SINICA] in Chinese Vol 4, No 1, Mar 77 pp 85-91

TEXT OF ENGLISH ABSTRACT: This paper deals with some problems in the history of genetics, namely, the interrelation between genetics and the evolutionary theory, genetics and eugenics, and genetics and philosophy. These problems reflect some aspects of class struggle in the society. Therefore it is important for the interests of revolutionary proletariat to have a keen insight into the relation of genetics to class struggle. The author presents his views on several instances in the history of genetics, having some bearing on this problem. It is hoped that the discussion will be continued by the broad masses of readers, armed with the ideological weapon of Marxism-Leninism and Mao Tse-tung Thought. All bourgeois and revisionist viewpoints should be criticized.

AUTHOR: None

ORG: Hainan Station Rice Modification Research Group, Institute of Genetics,  
Chinese Academy of Sciences

TITLE: "Modification Effect of  $Co^{60}-\gamma$  Radiation on Rice Plant Embryos at  
Different Stages of Development"

SOURCE: Peking I-CH'UAN SHUEH-PAO [ACTA GENETICA SINICA] in Chinese Vol 4,  
No 1, Mar 77 pp 78-81

ABSTRACT: From the sensitivity of rice embryo to  $Co^{60}-\gamma$  radiation, it is found that the zygote stage is most sensitive, and the primordial embryo stage the next, while the differentiation embryo stage has the strongest resistance to the radiation. The preferential  $\gamma$ -radiation doses are found to be: the zygote stage around 2,000 roentgen, the primordial embryo stage around 4,000 roentgen, and the differentiation embryo stage 8,000-12,000 roentgen. The early mature mutation frequency, or  $M_1$  of  $\gamma$ -radiation on K'o 6 rice varieties is 5.71 percent for the zygote stage, 4.67 percent for the primordial embryo stage and the differentiation embryo stage, which is 2-3 times higher than  $M_2$ . The later generation of the early mature mutation plant obtained from  $\gamma$ -radiation was found to be hereditary, and therefore can be provided for selection.

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CSO: 4009

GENETICS & BREEDING

AUTHOR: None

ORG: This Journal

TITLE: "Successful Culture of Plantlet from Trifoliate Rubber Anthers"

SOURCE: Peking I-CH'UAN YU YU-CHUNG [GENETICS & BREEDING] in Chinese  
No 3, May 77 p 3

ABSTRACT: This article reports successful artificial culture of a complete plantlet from the anthers of trifoliate rubber on February 1977, by the joint effort of Chinese Academy of Sciences' Institute of Genetics' Hainan Experimental Station, Kwangtung Pao-t'ing Tropical Crops Institute, and Kwangtung State-operated Wen-ch'ang Breeding Station. A discussion is made on the significance of the prospect of utilizing such inbred heterosis to breed and select high yielding, disease-resistant, wind-resistant and cold-resistant hybrid rubber.

AUTHOR: None

ORG: Anhwei Wu-hu District Institute of Agricultural Sciences

TITLE: "Rice Heterosis by the Two System Technique"

SOURCE: Peking I-CH'UAN YU YU-CHUNG [GENETICS & BREEDING] in Chinese  
No 3, May 77 pp 12-13

ABSTRACT: Based on the successful breeding of a hybrid rice varieties from an inbred steril system and a corresponding purple-marked restorative system, with the omission of the usual retention system, when the hybrid rice varieties grow in less than 120 days, and increases the yield by 20-40 percent, this article introduces the technique of culturing the inbred sterile system and the restorative system, and the breeding of the heterotic rice varieties.

AUTHOR: None

ORG: Kiangsi Communistic Labor University

TITLE: "No 73010 -- Rice Chemical Male Sterilizer"

SOURCE: Peking I-CH'UAN YU YU-CHUNG [GENETICS & BREEDING] in Chinese  
No 3, May 77 p 15

ABSTRACT: This article introduces the properties, characteristics and application technique of a new chemical male sterilizer for rice, developed from a series of experiments on more than 20 chemicals. The male sterilizer consists mainly of zinc methyl arsonate in acidic or basic solution at definite concentrations, and is sprayed onto the fertilized earings, as well as stems and leaves of rice plants.

AUTHOR: None

ORG: Shanghai Academy of Agricultural Sciences' Crops Institute

TITLE: "Asexual Propagation of Hybrid Rice - Revival of the Tiller and Stem Nodes"

SOURCE: Peking I-CH'UAN YU YU-CHUNG [GENETICS & BREEDING] in Chinese  
No 3, May 77 p 23

ABSTRACT: This article reports a series of experiments on the insertion planting of cut stem nodes from different sections of mature hybrid rice at various angles, as well as 2-3 cm long tiller sections of the stems of growing hybrid rice into rice fields for asexual propagation. It was found that oblique insertion, and cutting leaving 2 cm above the nodes, and 3 cm below the nodes give the highest revival rate, and that varieties too sensitive to light are unfavorable. A discussion is finally made on the advantages of such a technique, and how to cope with some problems, especially those involved with local climatic characteristics and others.

AUTHOR: None

ORG: Szechwan Academy of Agricultural Science' Crops Institute Hybrid  
Rice Research Group

TITLE: "Imaginery Consolidation of Rice Heterosis by Old Roots"

SOURCE: Peking I-CH'UAN YU YU-CHUNG [GENETICS & BREEDING] in Chinese  
No 3, May 77 p 24

ABSTRACT: This article proposes an imagery technique of utilizing old roots as a means of consolidating rice heterosis throughout the later generations, on the basis of the overwinter green characteristics of old roots in contrast to the other component part of the rice plant, provided the question of overwinter viability  $F_1$  can be solved. Three approaches to the problem are proposed, namely: 1) selection of multi-restorative old root sterile systems; 2) introduction of overwinter green characteristics of roots into existing good varieties; and 3) introducing the overwinter characteristics of roots into the present three systems being promoted.

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CSO: 4009

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